

AMENDMENTS TO THE CLAIMS

Kindly amend claims **35, 36, 42, and 52** as shown in the listing of claims below. This listing of claims will replace all prior versions, and listings of claims in the application.

LISTING OF CLAIMS

- 1 Claim 1. (original) A method for reducing stiction in a MEMS device having a moveable
2 element moveably coupled to a substrate, the method comprising:
3 a) providing the substrate with an anti-stiction member; and
4 b) interposing the anti-stiction member between the moveable element and the
5 substrate.
- 1 Claim 2. (original) The method of claim 1 wherein step b) includes actuating the
2 moveable element to interpose the anti-stiction member between the moveable
3 element and the substrate.
- 1 Claim 3. (original) The method of claim 2 wherein step b) includes substantially
2 immersing the moveable element in a liquid during actuation of the moveable
3 element.
- 1 Claim 4. (original) The method of claim 1, wherein step a) includes providing an anti-
2 stiction member that overhangs the moveable element.
- 1 Claim 5. (original) The method of claim 4, wherein the anti-stiction member includes one
2 or more flexible portions.
- 1 Claim 6. (original) The method of claim 5, wherein the one or more flexible portions
2 includes at least one double-serpentine portion.
- 1 Claim 7. (original) The method of claim 4 wherein the anti-stiction member is made of a
2 flexible material.

1 Claim 8. (original) The method of claim 4 wherein step b) includes actuating the
2 moveable element whereby the moveable element engages the anti-stiction
3 member causing the anti-stiction member to flex.

1 Claim 9. (original) The method of claim 8 wherein step b) includes flexing the anti-
2 stiction member sufficiently to interpose the anti-stiction member between the
3 moveable element and the substrate.

1 Claim 10. (original) The method of claim 1 wherein step a) includes:
2 providing a silicon-on-insulator (SOI) substrate;
3 defining the moveable element from a device layer of the SOI substrate; and
4 depositing a flexible material over the device layer and the moveable element
5 such that the flexible material overhangs the moveable element.

1 Claim 11. (original) The method of claim 1 further comprising: minimizing an area of
2 contact between the anti-stiction member and the moveable element.

1 Claim 12. (original) The method of claim 1 further comprising electrically isolating the
2 moveable element from a portion of the substrate.

1 Claim 13. (original) The method of claim 12 wherein the isolating step includes
2 interposing an insulating material between the anti-stiction member and an
3 electrically conductive portion of the moveable element.

1 Claim 14. (original) The method of claim 12 wherein the isolating step includes
2 interposing an insulating material between the anti-stiction member and the
3 portion of the substrate.

1 Claim 15. (original) An apparatus for reducing stiction in a MEMS device having a moveable
2 element moveably coupled to a substrate, the apparatus comprising:
3 an anti-stiction member that is interposable between the moveable element and the
4 substrate.

1 Claim 16. (original) The apparatus of claim 15 wherein the anti-stiction member is
2 attached to the substrate.

1 Claim 17. (original) The apparatus of claim 16 wherein the anti-stiction member is not
2 attached to the moveable element.

1 Claim 18. (original) The apparatus of claim 15 wherein the anti-stiction member is
2 cantilevered such that the anti-stiction member overhangs the moveable element.

1 Claim 19. (original) The apparatus of claim 15 wherein the anti-stiction member is made
2 from a flexible material.

1 Claim 20. (previously presented) The apparatus of claim 15 wherein the anti-stiction
2 member includes one or more flexible portions disposed between a fixed end and
3 a free end of the anti-stiction member.

1 Claim 21. (original) The apparatus of claim 20 wherein the one or more flexible portions
2 include at least one serpentine portion.

1 Claim 22. (original) The apparatus of claim 20 wherein the one or more flexible portions
2 include at least one double serpentine portion.

1 Claim 23. (original) The apparatus of claim 15 further comprising a standoff attached to a
2 free end of the anti-stiction member.

1 Claim 24. (original) The apparatus of claim 15, further comprising means for electrically
2 isolating the moveable element from a portion of the substrate.

1 Claim 25. (original) The apparatus of claim 24, wherein the means for electrically
2 isolating includes an electrically insulating standoff attached to a free end of the
3 anti-stiction member.

1 Claim 26. (original) The apparatus of claim 24, wherein the means for electrically
2 isolating includes an electrically insulating portion of the moveable element.

1 Claim 27. (original) The apparatus of claim 15, wherein the anti-stiction member includes
2 a serpentine shaped portion that is disposed between a free end and a fixed end of
3 the anti-stiction member.

1 Claim 28. (original) The apparatus of claim 15, wherein the anti-stiction member includes
2 one or more double-serpentine shaped portions that are disposed between a free
3 end and a fixed end of the anti-stiction member.

1 Claim 29. (original) A MEMS device, comprising:
2 a substrate;
3 a moveable element moveably coupled to the substrate, and
4 an anti-stiction member that is interposable between the moveable element and the
5 substrate.

1 Claim 30. (original) The MEMS device of claim 28 wherein the anti-stiction member is
2 attached to the substrate.

1 Claim 31. (original) The MEMS device of claim 30 wherein the anti-stiction member is
2 not attached to the moveable element.

1 Claim 32. (original) The MEMS device of claim 28 wherein the anti-stiction member is
2 cantilevered such that the anti-stiction member overhangs the moveable element.

1 Claim 33. (original) The MEMS device of claim 29 wherein the anti-stiction member is
2 made from a flexible material.

1 Claim 34. (original) The MEMS device of claim 29 wherein the anti-stiction member
2 includes one or more flexible portions disposed between a fixed end and a free
3 end of the anti-stiction member.

1 Claim 35. (currently amended) The MEMS device of claim [[29]] 34, wherein the one or
2 more flexible portions include a serpentine portion.

1 Claim 36. (currently amended) The MEMS device of claim [[29]] 34, wherein the one or
2 more flexible portions include at least one double-serpentine portion.

1 Claim 37. (original) The MEMS device of claim 29 further comprising a standoff
2 attached to a free end of the anti-stiction member.

1 Claim 38. (original) The MEMS device of claim 29 further comprising means for
2 electrically isolating the moveable element from a portion of the substrate.

1 Claim 39. (original) The MEMS device of claim 38, wherein the means for electrically
2 isolating includes an electrically insulating standoff attached to a free end of the
3 anti-stiction member.

1 Claim 40. (original) The MEMS device of claim 39, wherein the means for electrically
2 isolating includes an electrically insulating portion of the moveable element.

1 Claim 41. (original) The MEMS device of claim 29 wherein the moveable element
2 includes a light-deflecting component.

1 Claim 42. (currently amended) The MEMS device of claim 41, wherein the light-
2 deflecting component is a plane reflecting (or partially reflecting) surface, plane
3 partially reflecting surface, curved reflecting (or partially reflecting) surface,
4 curved partially reflecting surface, prismatic reflector, refractive element, prism,
5 lens, diffractive element, grating, fresnel lens, dichroic coated surface, waveguide
6 or some combination of these.

1 Claim 43. (original) The MEMS device of claim 41 wherein the light-deflecting
2 component is a mirror.

1 Claim 44. (original) The MEMS device of claim 29, wherein the moveable element is
2 configured to rotate.

1 Claim 45 (original) The MEMS device of claim 29, wherein the moveable element is
2 configured to translate.

1 Claim 46. (original) A method for fabricating a MEMS device, comprising:
2 providing a silicon-on-insulator (SOI) substrate;
3 defining a moveable element from a device layer of the SOI substrate; and
4 depositing a flexible material over the device layer and the moveable element such that
5 one or more portions of the flexible material overhang the moveable element,

6 wherein the flexible material is deposited such that the anti-stiction member is attached to
7 one end to a portion of the device layer,
8 wherein the flexible material is deposited such that the anti-stiction member is not
9 attached to the moveable element;

10 whereby the flexible material forms one or more anti-stiction members.

1 Claim 47. (original) The method of claim 46 wherein an insulating material is deposited
2 between defining the moveable element and depositing the flexible material.

1 Claim 48. (original) The method of claim 47, further comprising etching the insulating
2 material to release the moveable element.

1 Claim 49. (original) The method of claim 48, wherein the flexible material is resistant to
2 an etchant that is used to remove the insulating material.

1 Claim 50. (original) An optical switch, comprising:

2 a substrate;
3 one or more moveable elements moveably coupled to the substrate, and
4 an anti-stiction member that is interposable between at least one of the moveable
5 elements and the substrate.

1 Claim 51. (original) The optical switch of claim 50 wherein at least one of the moveable
2 elements includes a light-deflecting component.

1 Claim 52. (currently amended) The optical switch of claim 51 wherein the light-
2 deflecting component is a plane reflecting ~~(or partially reflecting)~~ surface, plane
3 partially reflecting surface, curved reflecting ~~(or partially reflecting)~~ surface,
4 curved partially reflecting surface, prismatic reflector, refractive element, prism,
5 lens, diffractive element, grating, fresnel lens, dichroic coated surface, waveguide
6 or some combination of these.

1 Claim 53. (original) The optical switch of claim 51 wherein the light-deflecting
2 component is a mirror.

1 Claim 54. (original) The optical switch of claim 50 wherein the anti-stiction member is
2 attached to the substrate.

1 Claim 55. (original) The optical switch of claim 54 wherein the anti-stiction member is
2 not attached to the moveable element.

1 Claim 56. (original) The optical switch of claim 50 wherein the anti-stiction member is
2 cantilevered such that the anti-stiction member overhangs the moveable element.

1 Claim 57. (original) The optical switch of claim 50 wherein the anti-stiction member is
2 made from a flexible material.

1 Claim 58. (original) The optical switch of claim 50 wherein the anti-stiction member
2 includes one or more flexible portions disposed between a fixed end and a free
3 end of the anti-stiction member.

1 Claim 59. (original) The optical switch of claim 58, wherein the flexible portion includes
2 a serpentine portion.

1 Claim 60. (original) The optical switch of claim 58, wherein the flexible portion includes
2 at least one double serpentine portion.